

Fig. 1I2 is an elevated plan view of one of the PLIMs employed in the PLIIM system of Fig. 1G1, taken along a viewing direction which is perpendicular to the central axis of the cylindrical lens element mounted within the axial bore of the VLD mounting block thereof, showing that the focusing lens planar focuses the laser beam to its minimum beam width at a point which is the farthest distance at which the system is designed to capture images, while the cylindrical lens element does not expand or spread out the laser beam in the direction normal to the plane of propagation of the planar laser illumination beam;

Fig. 1J1 is a geometrical optics model for the imaging subsystem employed in the linear-type image formation and detection module in the PLIIM system of the first generalized embodiment shown in Fig. 1A;

Fig. 1J2 is a geometrical optics model for the imaging subsystem and linear image detection array employed in linear-type image detection array employed in the image formation and detection module in the PLIIM system of the first generalized embodiment shown in Fig. 1A;

Fig. 1J3 is a graph, based on thin lens analysis, showing that the image distance at which light is focused through a thin lens is a function of the object distance at which the light originates;

Fig. 1J4 is a schematic representation of an imaging subsystem having a variable focal distance lens assembly, wherein a group of lens can be controllably moved along the optical axis of the subsystem, and having the effect of changing the image distance to compensate for a change in object distance, allowing the image detector to remain in place;

Fig. 1J5 is schematic representation of a variable focal length (zoom) imaging subsystem which is capable of changing its focal length over a given range: so that a longer focal length produces a smaller field of view at a given object distance;

Fig. 1J6 is a schematic representation of an illustrative embodiment of the image formation and detection (IFD) module employed in the PLIIM systems of the present invention, wherein various optical parameters used to model the system are defined and graphically indicated wherever possible;

Fig. 1K1 is a schematic representation illustrating how the field of view of a PLIIM system can be fixed to substantially match the scan field width thereof (measured at the top of the scan field) at a substantial distance above a conveyor belt;

Fig. 1K2 is a schematic representation illustrating how the field of view of a PLIIM system can be fixed to substantially match the scan field width of a low profile scanning field slightly above the conveyor belt surface, by fixed the focal length of the imaging subsystem during the optical design stage;

Fig. 1L1 is a schematic representation illustrating how an arrangement of FOV beam folding mirrors can be used to produce an expanded FOV that matches the geometrical characteristics of the scanning application at hand, when the FOV emerges from the system housing;

Fig. 1L2 is a schematic representation illustrating how the fixed field of view of an imaging subsystem can be expanded across a working space (e.g. conveyor belt structure) by rotating the FOV during object illumination and imaging operations;